MARSHALL STAR

Marshall Space Flight Center

April 6, 2000

"We bring people to space — We bring space to people"

Air-breathing rocket tests complete; new tests begin

by Deana Nunley

Taking another step toward making future space transportation more like today's air travel, the Marshall Center and its industry partners have completed a series of successful tests on air-breathing rocket engines.

The latest ground testing focused on engine performance during low-speed portions of the flight, when high thrust levels are needed to push the air-breathing rocket through Earth's atmosphere.

An air-breathing – or rocket-based, combined cycle – engine inhales oxygen from the air for about half the flight, so it doesn't have to store the oxygen on board. That reduces the vehicle's weight at launch, resulting in significant cost savings.

At launch, the engine is powered by specially designed rockets strategically placed in a duct that captures air. Once the vehicle reaches twice the speed of sound, the rockets are turned off and the engine relies totally on oxygen in the atmosphere to burn its fuel. When its speed increases to about 10 times the speed of sound, the engine converts to a conventional rocket-powered system for the final push to orbit.

Similar testing by Aerojet Corp. of Sacramento, Calif., and Rocketdyne of Canoga Park, Calif., showed that recent modifications to the engine's internal geometry improved performance. Aerojet conducted tests at its newly refurbished facility in



File photo

Fun + family = Great Moonbuggy Race

Two days of fun begin Friday as the Great Moonbuggy Race at the U.S. Space & Rocket Center in Huntsville kicks off.
Marshall civil servant employees and their immediate family members — spouse and dependent children up to 21 years of age living at home — will receive free access to the race Friday and Saturday. High school competition begins Friday at 10:30 a.m. with design judging. Racing starts at 12:30 p.m. College division judging starts at 7:30 a.m. Saturday with race times from 8:30 a.m. to approximately 5:30 p.m. Please enter the facility through the Space Camp entrance, below the large Space Shuttle. Present your Marshall civil servant badge at the gate to the guard for entrance. Everyone is encouraged to attend and bring his or her family. Above, Southern Illinois University, one of 14 university teams in last year's race, negotiates a "moonscape" obstacle.

See Rocket on page 7

Earth to Orbit

Students tackle NASA engineering challenge

by Sherrie Super

hen students from five states participated in NASA's Earth to Orbit Engineering Design Challenge, they tackled some of the same issues NASA engineers face when designing spacecraft.

On Thursday and Friday, more than 40 students and teachers will meet with Marshall Center Director Art Stephenson, tour Center facilities and interact with Center employees — including engineers from the Space Transportation Program.

"Safety, Thanks to You, It's Working"

— Safety slogan submitted by **Zena Hester, SD42**

The group will attend the "NASA Goes to the Stars" baseball game Thursday night at Joe Davis Stadium. On Friday, the students and teachers will tour the Product Enhancement Complex and the International Space Station mock-up, participate in a symposium from 10:30 a.m.-noon, watch the Great Moonbuggy Race, and build and test models at the Educator Resource Center.

During the symposium at the Bldg. 4203 cafeteria, the students will present their projects to Marshall engineers and scientists, and share their experiences in small group discussions. All Marshall Center people are invited to attend the

symposium.

The NASA-sponsored program gives students in their classrooms a feel for the challenges faced by NASA engineers designing the next generation of space vehicles.

And it helps students in the program's targeted grades six through nine achieve national goals for developing science, math and thinking skills.

Students were challenged to build a thermal protection system, or heat shield, for a model of the X-33 experimental vehicle. NASA's X-vehicle program,

See Students on page 3



Arrival of the original German rocket team changed Huntsville and the space and rocket program.

File photo

Von Braun team arrived in Huntsville 50 years ago

by Mike Wright

A stranger passing through Huntsville on May 15, 1950, might have glanced at the front page of the newspaper and thought the headlines referred to some itinerant German scientist passing through town to lecture for one night at the local public library or civic club.

Few would have believed that "the foremost authority in the world today on rockets" had recently moved for the long-term to a small Southern town marked more by cotton traders and mule-drawn wagons than any apparatus related to rockets and space flight.

The new resident's name was Wernher von Braun. He had moved to Huntsville a little more than a month before the newspaper interviewed him.

But von Braun had not come alone. He had traveled with other members of his famous World War II German rocket team from Fort Bliss, Texas, to Huntsville. Von Braun and the others had surrendered to U.S. forces following World War II and had worked under contract to the U.S. Army on missile development at Fort Bliss.

When the Army decided to expand its rocket-development activities at the end of the 1940s, the von Braun team was transferred to larger facilities at Redstone Arsenal in Huntsville. By 1960, von Braun

and his team with an expanded U.S.-born contingent would form the nucleus of the new NASA Marshall Space Flight Center in Huntsville. Von Braun served as Marshall's first director from 1960 until 1970.

This year marks the 50th anniversary of the von Braun team's arrival in Huntsville, an event that changed the city and the U.S. space and rocket program forever.

During the 1950s, the von Braun team developed the Army's first heavy ballistic missile, the Redstone, and the Jupiter-C rocket that would launch America's first satellite, Explorer I. Soon after forming the new Marshall Center, the team launched the first American astronaut, Alan Shepard, into space using a modified Redstone.

Another Huntsville rocket, the Saturn V, would take humans to the Moon. Engineers and scientists at Marshall also would develop a lunar roving vehicle, a Skylab space station, a series of high-energy astronomical telescopes, and the engines, boosters and fuel tank needed to power the Space Shuttle.

All of it influenced the American space program, and all of it transformed Huntsville. When the German team arrived in Huntsville in 1950, Huntsville's population was 16,000. By 1956, rocket engineers and scientists from across the United States pushed the population to 48,000.

The character of the population changed as well. The city "draws top talented physicists from New England, machine workers from the East Coast, electrical engineers from the Midwest and promising young chemists from Georgia Tech and California," said U.S. News and World Report.

Residents searched for ways to accommodate the city's rapid growth. Hannes Luehrsen, who had been trained in architecture and city planning in Germany, drew plans for a major detour around the city's original business district.

There were other changes too. The Germans heightened the community's cultural climate by promoting and participating in musical and artistic endeavors. Von Braun led the drive to build an astronomical observatory and telescope on nearby Monte Sano.

But the event that capped all of these achievements came July 16, 1969, when a huge Saturn V rocket developed by the von Braun team at Marshall launched three Americans on the first journey to the surface of the Moon.

All of it stemmed, of course, from the arrival of the von Braun team in Huntsville 50 years ago this month.

The writer is a historian in the Internal Relations and Communications Department.

2 MARSHALL STAR April 6, 2000

Survey: NASA employees among most satisfied federal workers

A ccording to a recent government survey, NASA employees enjoy a greater level of job satisfaction than do most other federal workers.

The National Partnership for Reinventing Government Employee Survey showed NASA employees gave the agency the highest favorable ratings in 14 out of 32 categories.

NASA's highest favorable ratings were in the areas of employee job satisfaction, customer orientation and placing reinvention as a priority. NASA's employees pointed to several factors for the high ratings: employee involvement in decisions that directly affects them; recognition for creativity and innovation and for doing a good job; working as a team; and getting quality results.

NASA also finished with the highest favorable ratings on questions about managers communicating the organization's missions, vision and values; employee participation in crossfunctional teams; and supervisors/team leaders understanding and supporting employees' family and personal responsibilities.

"I am incredibly proud of these results," said NASA Administrator Dan Goldin. "They represent a strong statement of the top-to-bottom excellence of the NASA team.

"NASA strives to uphold core values related to people, excellence and integrity," Goldin said. "Our greatest strength is our work force. We are committed to demonstrating and promoting excellence and continually improving processes, products and services to better satisfy our customers' needs and requirements."

NASA, the nation's premier civilian research and development agency, manages 10 facilities in eight states around the country.

Additional survey information is available on the Internet at: www.nasa.gov/newsinfo/survey.html

'Turning Goals Into Reality'

Conference to showcase achievements, introduce next-level technology

Hundreds of aerospace and transportation officials, engineers and scientists are slated to gather May 18-19 for NASA's second "Turning Goals Into Reality" conference, hosted by the Marshall Center.

Among the topics of discussion: NASA's future research directions and partnership opportunities for technological advances in aeronautics and space flight research, including revolutionary engineering tools and processes for launching air and space transportation firmly into the 21st century and beyond.

The conference will showcase recent aerospace accomplishments by NASA and its industry partners, conduct panel discussions on the state of transportation research today and hold workshops on breakthrough technologies that may increase mission safety and reliability and cut costs.

Confirmed conference speakers include NASA Administrator Dan Goldin; Vern Raburn, president and chief executive officer of Eclipse Aviation Inc.; and Samuel Venneri, NASA's chief technologist and associate administrator for the Office of Aero-Space Technology.

The event will be held at the Marshall Center and the Huntsville Marriott, and will precede Marshall's Open House on Saturday, May 20.

For more information about the "Turning Goals into Reality" conference, visit the Web site at: http://tgir.msfc.nasa.gov

Students —

Continued from page 1 managed by the Marshall Center, is designed to demonstrate technologies and operations aimed at lowering launch costs from \$10,000 per pound to \$1,000 per pound.

Using common materials such as nuts, washers, screening and aluminum foil, the students teamed up to build a protective shield to keep their X-33 models from melting when exposed to the heat of a propane torch. This is similar to the challenge faced by designers of the real X-33: how to keep the vehicle from burning up when it re-enters Earth's atmosphere.

Under teacher supervision, the

students designed, tested, re-designed, rebuilt and re-tested models that met specified design criteria. Each student team then prepared a poster to describe the process and results of their work. The challenge culminates this week during their visit to Marshall. Each school selected two students and the project teacher to come to the Center to present their ideas and learn more about NASA.

Participating schools are:

- Charleston High School, Charleston, Mo.;
- Meridianville Middle School, Hazel Green;
 - Ed White Middle School, Huntsville;

- Williams Technology Middle School, Huntsville:
- Lake Los Angeles Middle School, Lake Los Angeles, Calif.;
- Coffey County Middle School, Manchester, Tenn.;
- Melrose Middle School, Melrose, Mass.;
- Northfield Mount Hermon School in Northfield Mass.;
- San Clemente High School, San Clemente, Calif.; and
- Tewksbury High School, Tewksbury, Mass.

The writer, employed by ASRI, supports the Media Relations Department.

April 6, 2000 MARSHALL STAR

Supply specialist uses Scouting skills on-the-job

by Debra Valine

William Parks "Chip" Dobbs III uses skills he acquired as a Boy Scout to perform his daily duties as a supply specialist in Marshall's Center Operations Directorate.

Born is Gadsden, Dobbs, who is hearing impaired, left home at age 6 to attend the Alabama School for the Deaf in Talladega. He studied there until he was 20.

At 12, Dobbs joined an all-deaf and hearing-impaired Scout troop. "I really liked camping out and hiking," Dobbs said. "I just wanted to be a Boy Scout." Scoutmaster Moran Colburn, who is deaf, mentored him. Colburn also was his football coach, driver's education teacher and friend.

Dobbs recently traveled to Orlando, Fla., to interpret for Colburn at a ceremony recognizing Colburn's 65 years of service to the Boy Scouts of America.

It was a very special moment for Dobbs. Dobbs also spoke at the ceremony about his job at the Marshall Center, where he has worked since 1994.

The Boy Scouts taught Dobbs about community service. Under Colburn's



Chip Dobbs, right, interpreted for Moran Colburn at the recent awards ceremony.

leadership, Dobbs was the first deaf Explorer Scout to receive the Young American Award — a community service award for leadership. He was selected out of 65 applicants for the award.

Interpreting for his long-time mentor is just one example of his community service. At Marshall, Dobbs serves on the Disability Advisory Committee with the Equal Opportunity Office and other committees, such as the Marshall Open House on May 20.

He was on the Apollo 11 anniversary celebration committee. He was a part of the team that coordinated the move of employees' furniture for the Marshall move in 1999.

"I do what I can to help people," Dobbs said.

In his spare time Dobbs, who made Eagle Scout in 1976, is assistant Scoutmaster for Troop 204 in Madison, a troop with 40 boys aged 11-18. "I teach merit badges and disability awareness to the Scouts," Dobbs said. He also teaches American Sign Language at the Alabama Institute for the Deaf and Blind Huntsville Regional Office.

For Dobbs, his fondest memory of Scouting is when his troop, under Colburn's leadership, constructed the Chinnabee Silent Trail at Mt. Cheaha in the Talladega National Forest in Talladega County, Ala. The youngsters of the troop—all deaf—spent two years cutting the 6-mile hiking trail opened in 1971. They carried lumber on their shoulders for miles to build the trail.

Dobbs and his wife Sally have a 1-yearold son, Christopher. "Scouting has made a big impact on my life," said Dobbs. "Whether or not my son follows me into Scouting when he's old enough will be up to him."

The writer, employed by ASRI, is the Marshall Star editor.

Elements for becoming a VPP Star site

Marshall Medical Center provides comprehensive program

Editor's note: This is the fifth in a series of articles to address frequently asked questions on the 19 elements in the Voluntary Protection Program.

Q: Does Marshall have a medical program?

A: Occupational Medicine and Environmental Health Services located at the Marshall Medical Center in Bldg. 4249 provides the Center with a comprehensive program. The program consists of the following services: preventive medicine, therapeutic medicine, emergency medicine including paramedic-staffed ambulance support, industrial hygiene and radiological health.

Q: Who can use the Medical Center?

A: The Medical Center offers annual voluntary physical examinations to all civil service personnel. Mandatory monitoring physical examinations as required by Occupational Safety and Health Administration, Nuclear Regulatory Commission and Department of Transportation are provided to employees, including onsite contractors, who may be exposed to potential hazardous conditions while on the job.

Walk-in clinic services also are provided for civil service employees with minor illnesses and injuries and for both civil service and contractor employees who encounter job-related illness and injury.

As a preventive medicine service, special support is provided for the following activities: Centerwide screening programs for hypertension, immunization requirements for official foreign travel (limited contractor support), allergy medication administration, tetanus/diphtheria immunization and an annual voluntary immunization program for influenza are offered to both civil service and onsite contractor personnel.

Q: When is the Medical Center open?

A: The Medical Center is open from 7 a.m. to 3:30 p.m., Monday through Friday, excluding federal holidays. Emergency Medical Services are available 24 hours a day, seven days a week by dialing 911 on site or 544-HELP (4357) when using a cellular phone or other outside telephone line.

For additional information or to schedule an appointment, call 544-2390.

MARSHALL STAR April 6, 2000

National Manufacturing Week

Marshall touts space programs in Chicago

The Media Relations Department's Exhibits Program participated in National Manufacturing Week activities in Chicago March 13-16. Representatives from Space Transportation's Advanced Space Transportation, X-33 and Pathfinder programs, along with the Shuttle Program Office and Microgravity's Space Product Development, talked to more than 29,000 attendees at the event.



Chris Naftel, left, of Marshall's X-33 program, explains a stereo lithography piece used for fit checks for the X-33 vehicle.





Marshall's exhibit in Chicago for the National Manufacturing Week activities.



Linder Metts, right, assistant manager of Marshall's Space Shuttle Projects Office, talks with attendees about solid rocket boosters.

George Scelzo, second from right, president of PRT Systems Inc. of Park Forest, III., and a NASA business partner with the Space Transportation Directorate program, talks about maglev launch possibilities.

Security enforces parking regulations at Marshall

The Protective Services Department has received several reports and a number of phone calls and e-mails pertaining to parking and its impact on safety.

A survey of the Center showed numerous locations where personnel were parking in no-parking areas. In some cases parking in prohibited areas has created safety hazards by restricting emergency vehicle access and blocking the view of other vehicles and pedestrians.

MPG 1600.1, MSFC Security Procedures and Guidelines, states that a parking space is "identified by bumper blocks, markings on a curb, or lines painted on the pavement. Parking is prohibited in any area not so marked or on grassed areas." Unless

an area is specifically marked for parking, it is considered a no-parking area.

Uniformed security officers are placing increased emphasis on enforcing parking regulations. Employees are urged to park only in designated parking spaces. If you have questions on parking, call Dan Ahlander at 544-4533.

April 6, 2000 MARSHALL STAR

Researchers design, build, test solar thermal engine

by Debra Valine

arshall researchers — on a continuous quest to develop alternate propulsion systems — have designed, fabricated and tested Marshall's first solar thermal engine, a non-chemical rocket that produces lower thrust but has better thrust efficiency than chemical combustion engines.

The Phase I Direct Gain Solar Thermal Thruster/Absorber and its test facility were developed in-house by a

team led by
Harold P.
Gerrish Jr. of
the Propulsion
Research
Center and
included
engineers from
across the
Center.



Harold P. Gerrish Jr.

Marshall turned to solar thermal

propulsion in the early 1990s due to its simplicity, safety, low cost and commonality with other propulsion systems. Solar thermal propulsion works by acquiring and redirecting solar energy to heat a propellant. Private industry has shown interest in this technology as a lower cost alternative for transporting payloads to higher orbits.

"The concept did not have as many engineering hurdles to overcome as other advanced propulsion concepts," Gerrish



Components for the solar thermal propulsion engine are laid out prior to assembly.

said. "A 1994 in-house study gave requirements for a solar thermal upper stage. We addressed the engine technologies that needed to be ground-tested so that the upper stage could become marketable."

The team used funds primarily from the Center Director's Discretionary Fund to design and fabricate the engine, along with a new solar thermal experiment facility in Marshall's East

Test Area. Marshall's in-house resources were used for design, fabrication and other tasks. Members of the group were assembled from the former Program Development Office; Propulsion Laboratory's design and test area; Thermal/Fluid Analysis, Stress Analysis, and plume expansion of the Structures and Dynamics Laboratory; vacuum plasma spray, metals, non-metals, design and fabrication from the Materials and Processes Laboratory; and the Optics Lab of the Astrionics Laboratory.

"We used every potential resource available to us," Gerrish said. "The only major part of the project that was not done at Marshall was the diamond-turning of the test facility mirrors, which was performed at Oak Ridge National Laboratory in Tennessee."

The team designed the solar thermal test facility accounting for lessons learned from

operation of the Air Force Research Lab's solar thermal test facility at Edwards Air Force Base in Edwards, Calif.

The Marshall facility, which has an estimated value of several million dollars, was assembled primarily from excess equipment and materials. The total Marshall expenditures for the project were approximately \$200,000.

The performance goal of the Phase I tests was to get the engine as hot as possible. This



Photos by Dennis Olive, NASA/Marshall Space Flight Center The solar thermal test facility.

meant using materials with very high melting points. "For the first engine, we chose tungsten since it has the highest melting temperature of all refractory metals, and it has a low cost of \$30 a pound," Gerrish said.

The problem with tungsten is that it is not an easy material with which to fabricate. "We had to develop a new process for making the engine out of tungsten," Gerrish said. "Several members of the team are currently pursuing a patent on the design and unique fabrication process."

Although heating was the primary goal, the engine had to be tested with solar energy because its absorber cavity is designed to operate with a distribution of light energy available from the Sun. The test facility consists of a heliostat, a 6-meter diameter concentrator and a quartz-windowed vacuum chamber. The heliostat tracks and directs solar energy to the concentrator, which then focuses the light to a 4-inch diameter focal point within the vacuum chamber.

"We put the engine in the vacuum chamber, which was designed to simulate, as much as possible, the space environment in which it would operate," Gerrish said. "With the engine operating, you want very low ambient pressure during the runs to minimize convective heat loss and allow full nozzle expansion."

"You can put most types of solar thermal engines into the Marshall facility

See Solar Thermal on page 7

April 6, 2000

Solar Thermal

Continued from Page 6

for tests, as well as electrothermal engines," Gerrish said. "We designed it for multiple uses."

Several companies are interested in the solar thermal facility because it was designed for engine tests with hot hydrogen. The facility can focus 10,000 watts into the test chamber. It uses 144

mirror segments to channel energy in 70-watt increments and control both focal point intensity and half angle of concentration.

"This is the only major facility with this kind of control," Gerrish said. "But to reach maximum power in



The engine is placed in the facility prior to testing.

Huntsville, we must have clear skies and 1,000 watts of solar energy per square meter." The baseline design was to operate two hours before and two hours after the Sun's highest elevation in the sky each day.

The Phase I engine tests were successful, but the engine was evaluated at only 40 percent of its maximum design power level. Operating closer to its maximum capacity will require the addition of a secondary concentrator in front of the absorber cavity. This will focus more of the available energy into the thruster and increase its operating temperature and performance.

The writer, employed by ASRI, is the Marshall Star editor.

Rocket -

Continued from page 1

Sacramento, while Rocketdyne conducted tests at the General Applied Sciences Laboratory (GASL) on Long Island, N.Y.

Meanwhile, the Marshall Center's academic partner, Pennsylvania State University of University Park, finished the first phase of its experimental work on air-breathing rocket engine development in mid-March and immediately started a second phase of activity. The experimental research now under way will examine



The air breathing rocket recently completed a series of successful tests.

the effect of two rockets in a duct and the use of hydrocarbon fuels, instead of hydrogen.

The writer, employed by ASRI, supports the Media Relations Department.

Upcoming Events

Easter Egg Hunt — The annual NASA Exchangesponsored Easter Egg Hunt will be Sunday. Registration for door prizes begins at 2 p.m. followed by the hunt at 2:30. Children of both Marshall employees and onsite contractors may participate. In case of rain, the event will be April 16 at 2 p.m. For more information, call Gena Marsh at 544-0128 or Donna Mahieux at 544-7511. **Avionics Open House** — Marshall's Avionics Department is hosting an open house from noon-4 p.m. April 20. The event starts in the main lobby on the south side of Bldg. 4487. Avionics capabilities, products and facilities will be featured in Bldgs. 4487, 4190 and 4194 (by bus only, at 1:30 p.m.), 4436, 4475, 4476, 4619, 4656 and 4663. Reserved visitor parking will be provided in the south parking lot, across from the main lobby of Bldg. 4487.

Community Leaders' Breakfast — Marshall's annual community leaders' breakfast will be at 7:30 a.m. April 20 in the Bldg. 4203 cafeteria. Those invited include the board of directors of the Huntsville/Madison County Chamber of Commerce, Madison City Chamber of Commerce, North Alabama African-American Chamber of Commerce, Gadsden Chamber of Commerce, Athens/ Limestone County Chamber of Commerce, Decatur-Morgan County Chamber of Commerce, Alabama Commission on Aerospace Science and Industry, and local elected officials. To attend, go to "Inside Marshall" and sign up by April 13. Employees are encouraged to pay in advance by sending \$6.75 to Judy Green, CD01, or pay by cash or check at the door. Employees who request to attend, but fail to do so, will be billed.

RSIC Open House — The Redstone Scientific Information Center (RSIC) will hold an open house from 2-4 p.m. April 13 in Bldg. 4484, off Martin Road. Food and refreshments will be served. The center is a catalyst and partner for sustained economic growth of local industries, universities and government activities. It provides information to NASA, the U.S. Army, Department of Defense, their industrial partners and universities. Facility hours are Mondays, 11 a.m.-6 p.m.; Tuesdays-Thursdays, 7:30 a.m.-6 p.m.; and Fridays, 7:30 a.m.-4 p.m. The third floor closes at 4 p.m. daily. Among the new options for patrons is a library card allowing patrons access to the center by the Internet, 24 hours a day and seven days a week, and access to books and technical journals that the library maintains. Patrons registered with the center may get their library cards at the open house. The Web site is located at: http://library.redstone.army.mil.

For more information, call Martha Knott at 842-8434 or Pam Kilgo at 313-5175.

Employee Ads

Miscellaneous

- ★ Old German violin outfit, recent setup, new bridge and strings, full size, \$400. 534-8186
- Chipper/shredder, 8HP, \$300. 828-4564
- Black lacquer water bed, king size, 3 years old, \$125; kid's slide, \$40, kids' sand box, \$40. 858-8074 after 5 p.m.
- ★ Fiberglass camper top, Century, Roadrunner, high top rear door, tinted glass, sliding front window, fits full-size truck. 778-7867 after 5 p.m.
- ★ Satellite dish, 8', electronics not provided, \$100. 880-6335
- 1987 Stratos bass boat, 19"3", 200 Mercury, 12/ 24 TM, hotfoot, 2DF, \$7,500 obo. 233-5032
- Travel tenders: Fisher Price w/bassinet, \$60; Graco, \$30; Century, \$35; Step 2 rocking fish, \$12. 586-2349
- ★ Jaz drive, 1MB, Iomega w/disk, \$110. 325-6000
- ★ Four 15x8 five-spoke chrome wheels w/Dunlop P265-50R15 tires, plus two additional tires, \$600. 722-0076
- ★ Large pet porter, \$25. 852-3501 after 4 p.m.
- ★ 1989 travel trailer, 35', yellow stone, one slide out, \$12,000; Concession trailer, 24', loaded, \$22,000. 895-0838
- ★ Aquarium stand w/double doors, solid wood, 55 gallon, \$35. 721-2239
- Frigidaire window air conditioner, 12m600 BTU, \$75. 534-4968
- ★ Apple 6100/66 DOS, 72MB, 2GB, dual monitors, printer, \$450; Mac/PC optical, 4.1GB/18 disks, \$250; 500MB ext. SCSI, \$60. 828-6213
- ★ Troybilt string trimmer/mower, 6HP, electric start, \$500 obo. 509-9545
- External modem for Mac, 56K, \$40; 100MB zip drive for Mac/SCSI, \$50. 232-1940
- Pickup truck bed liner for LWB truck, \$75. 582-
- Amateur radio, Yaesu FY-8100, dual band (VHF/ UHF) mobile transceiver, \$350 obo. 464-5685
- Bedroom suite: headboard, chest, night stand, and dresser, \$350; various golf clubs. 536-8951

Vehicles

- ★ 1965 Mustang, 289, auto, white, \$6,350; 1993 Blazer Tahoe LT, 4WD, V-6, 85K miles, \$9,250. 776-4331
- ★ 1987 Porsche 924S, white w/black interior, 5speed, var-PS, PW, sunroof, 30 mpg, alloy wheels, 74K miles, \$6,000 obo. 828-6213

- ★ 1993 Chevy, extended cab, 104K miles, new tires, \$10,500; 1993 Acura Legend, 87K miles, \$12,500, 880-8008
- 1993 Ford Taurus GL, all options, \$4,500 obo. 776-4726
- 1999 Chrysler 300M, 9.3K miles, white, \$25,250. 518-9618
- ★ 1988 Ford Thunderbird Turbo coupe, 185K miles, 5-speed transmission, AM/FM cassette, white w/red leather, \$2,000. 233-3829
- ★ 1991 Toyota Celica GT, 5-speed, black, 120K miles, a/c, cruise, cassette, \$4,500. 883-7187/ leave message
- ★ 1991 Dodge Caravan, maroon, \$2,500 obo. 721-3383
- 1995 Buick Park Avenue, ultra, blue/blue leather, 85K miles, \$9,500 obo. 721-0710
- ★ 1999 Explorer Sport, white, CD, 2WD, automatic, 45K miles, warranty to 75K miles, \$19,000. 828-9861
- 1989 Lincoln Town Car, black, 90K miles, \$4,750. 864-0155
- ★ 1996 Mazda 626 LX, V-6, 61K miles, white, sunroof, 5-speed, 22-27 mpg, \$10,150. 574-5098
- ★ 1993 Chevy Cavalier station wagon, red, ABS, a/c, power locks, 110K miles, \$2,990. 536-7290
- 1996 Honda Civic, silver, 59K miles, 5-speed, a/c, upgrades, \$10,950 obo. 882-5363
- ★ 1992 Lincoln Town Car, Executive Series, 60K miles, \$8,500. 586-7375
- 1989 Chevrolet Blazer S-10, white, air, ps/pb, moon-roof, 165K miles, \$2,500. 883-8947
- 1995 Buick LeSabre Limited, 64K miles, \$12,100. 539-3858

Free

★ To good home, black lab mix dog, male, approx. 1 yr. old, all shots, neutered, 883-9339

Wanted

- ★ Used child's wooden swing set/play set. 828-
- To borrow or rent: a reel-to-reel tape recorder that can run at 1-7/8 speed for old audio file transfer. 881-0551

Center Announcements

■ NARFE Meets — The National Association of Retired Federal Employees (NARFE) will meet at 9:30 a.m. Saturday at the Senior Center on Drake Avenue. Kathrine Funston, the training integrator in the crew training office at the

- Marshall Center will discuss a number of examples of space program technologies that have found their way into everyday use. For more information, call 837-0382 or 881-3168.
- Software of the Year Nominations Deadline to submit nominations for the annual Software of the Year Award is April 14. Competition guidance is available on the Web at: www.hq.nasa.gov/office/codei/swy99win.html For more information, call James J. McGroary at 544-0013 or Abbie Johnson at 544-0014.
- 'Secret Garden' Tickets A limited supply of tickets for "The Secret Garden," the Tony Awardwinning Broadway musical based on the children's book by Frances Hodgson Burnett's, are available at the NASA Exchange Space Shop in Bldg. 4752. The performance dates at the Von Braun Center Playhouse are as follows: Friday, April 7, 7:30 p.m.; Saturday, April 8, 2 p.m. and 7:30 p.m.; Sunday, April 9, 2 p.m.; Thursday, April 13, 7:30 p.m.; Friday, April 14, 7:30 p.m.; and Saturday, April 15, 2 p.m. and 7:30 p.m. Tickets are \$14.50 for adults and \$10 for students and seniors. For more information, call Candy Bailey at 544-2185.
- Dinner has been scheduled for June 22 at the Von Braun Center.
- MARS Ballroom Dance Club Rumba and samba lessons begin at 7 p.m. April 10, 17 and 24 in the Parish Hall of St. Stephen's Episcopal Church at 8020 Whitesburg Dr. The lessons will be taught by Don Worrell and will cost \$6 per person per night. For more information, call Woody Bombara at 650-0200.
- **☞ S&H Barber Shop** S&H Barber Shop in Bldg. 4203 is open daily from 8 a.m.-4:45 p.m. The shop provides a full range of hair care services for men and women. Marshall employees, retirees, contractors and family members may use the service. For more information, call 881-7932.
- Facilities Office Breakfast The Facilities Office employees, retirees and friends will meet for breakfast at 8 a.m. April 11 at Shoney's on University Drive. For more information, call Carl Gates at 232-2695.

Job Opportunity

CPP 00-54-KP, Internal Relations & Communications Officer, GS-301-14/ 15, Customer & Employee Relations Directorate. Closes April 6.

MARSHALL STAR

Vol. 40/No. 30

Marshall Space Flight Center, Alabama 35812 (256) 544-0030

http://www1.msfc.nasa.gov

The Marshall Star is published every Thursday by the Internal Relations and Communications Department at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration. Contributions should be submitted no later than Monday noon to the Marshall Internal Relations and Communications Department (CD40), Bldg. 4200, room 101. Submissions should be written legibly and include the originator's name. Send electronic mail submissions to: intercom@msfc.nasa.gov The Marshall Star does not publish commercial advertising of any kind.

> Acting Manager of Internal Relations and Communications — Tereasa Washington Editor — Debra Valine

U.S. Government Printing Office 1999-533-127-80105

BULK RATE Postage & Fees PAID NASA Permit No. G-27